

# Optimization with OPL Development Studio

## Courses

This is a training program in 2 courses, designed to show analysts, designers and programmers how to use an integrated development environment in optimization projects:

- Mathematical Programming key concepts (for non-OR Specialists) are explored in a new, 1-day course, *Learning MP for OPL Development Studio*:
- Hands-on practice building OPL programs, accompanied by explanatory lectures and demonstrations of the OPL language, form the core of the 3-day course (for everyone), *Optimization with OPL Development Studio*:

## Outline

### *Introduction to optimization with ILOG OPL*

OPL and optimization: the big picture  
 Inside OPL Development Studio  
 Example: a production planning problem

### *Optimize production using LP*

The telephone production process problem  
 OPL structures for modeling the telephone production problem

### *Solving Problems Using Constraint Programming*

Introduction to CP  
 A map coloring problem  
 Constraint Programming in OPL

### *Production planning and OPL data structures*

Problem - How much to outsource?  
 More about OPL data structures  
 The tuple data structure  
 Set structures in OPL

### *Infeasibility and unboundedness*

Solving the infeasible model

### *Combinatorial Problems*

A warehouse allocation model  
 Mixed Integer Programming (MIP)  
 Comparison of CP with MP

### *Specialized Problem Structures*

Piecewise linear problems  
 Product delivery: a network problem

### *Program control and sparsity*

Formal parameters  
 Data consistency  
 Sparsity and slicing  
 Some additional consideration

### *Portfolio optimization with QP*

Quadratic programming and OPL

## Objectives

Experiment with OPL to solve various optimization problems:

- Discover the easy-to-use graphical environment
- Build the problem representation
- Use the complete development and testing environment
- Integrate the model into applications

Get a clear understanding of OPL features and the underlying algorithms.

## Prerequisites

- No course prerequisites for people with OR experience
- For those with no OR experience, *Learning MP for OPL Development Studio*.

## Length

- *Learning MP for OPL Development Studio*: 1 day
- *Optimization with OPL Development Studio*: 3 days
- 9:00 am – 6:00 pm

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## *Linking to spreadsheets and databases*

Linking with a spreadsheet  
 Connecting to a database  
 Reading from a database  
 Writing to a database

## *ILOG Script*

About ILOG Script  
 ILOG Script basics  
 ILOG Script extensions for OPL

## *ILOG OPL Interfaces*

General principles  
 OPL extension classes  
 OPL data handling extension classes  
 The oplrun command

## *Optimizing algorithms*

Choosing your engine  
 CPLEX optimizers  
 Controlling optimization

## *Optional topics*

More on the OPL IDE Interface  
 From model to application – The ODM connection  
 Tips for performance tuning